

REMARKS/ARGUMENTS

Claims 20, 21, 23-46 and 54 are pending herein. Claim 22 has been canceled without prejudice or disclaimer in favor of new claim 54, which includes additional features that are supported by original specification paragraphs [0128] and [0113], and Table 1, for example. Claims 23-28 have been amended to depend from claim 54 and to correct matters of form. Claims 1-19 and 47-53 have been cancelled without prejudice or disclaimer in response to the Restriction Requirement. Claims 20, 21 and 29-46 have been withdrawn from consideration in response to the Restriction Requirement, but are being maintained in the present application.

1. Applicants hereby affirm the provisional election to prosecute claims 22-28 in the present application. The non-elected claims have been either withdrawn or canceled without prejudice or disclaimer. Applicants presently intend to file a divisional application for the non-elected claims, and thus reserve the right under 35 U.S.C. §121.

2. The objection to claims 25 and 26 is noted, but deemed moot in view of rewritten claims 25 and 26 submitted above.

3. Claims 22-25, 27 and 28 were rejected under §102(b)/§103(a) over Higuchi et al. This rejection is moot in view of the cancellation of claim 22. To the extent that this rejection might be applied against pending claim 54 (and all claims depending therefrom), it is respectfully traversed.

As discussed above, pending claim 54 corresponds to original claim 22 and includes additional features that were not recited in claim 22. Pending claim 54 recites, among other things, a lithium secondary cell having an electrode body

contained in a cell case and impregnated with a non-aqueous electrolyte. The capacity of the lithium secondary cell is at least 2 Ah, and a ratio of a limit discharging current to the cell capacity is at least 30.

The non-aqueous electrolyte includes a lithium compound dissolved in an organic solvent including a composition having at least one ring-shaped carbonate and at least two chain-shaped carbonates. A penetration rate of the non-aqueous electrolyte or the organic solvent through the separator per unit time and per unit area is at least $0.25 \text{ mg/min}\cdot\text{cm}^2$, with the penetration rate being expressed with a gradient of regression line formed by at least two measured amounts of the non-aqueous electrolyte or the organic solvent having passed through the separator over at least two time intervals.

Applicants were the first to discover that a particular non-aqueous electrolyte composition (at least one ring-shaped and at least two chain-shaped carbonates) and a rate that the non-aqueous electrolyte or the organic solvent penetrates through a separator material can be used as limiting factors during the manufacture of a lithium secondary cell in order to insure the production of a battery having a relatively large cell capacity (i.e., at least 2 Ah) and desired discharge current characteristics.

Higuchi's stated goal is to provide a separator for a battery having adequate electrical resistance properties, suitable mechanical strength and good shut-down characteristics (see column 2, lines 58-61). Higuchi does not, however, provide any disclosure concerning battery capacity or the amount of current discharged from the battery. As discussed above, pending independent claim 54 recites that the capacity of the lithium secondary cell is at least 2 Ah, and a ratio of a limit discharging current to

the cell capacity is at least 30. Upon reading the Higuchi patent, skilled artisans would have had no reason to believe that a secondary cell incorporating Higuchi's separator structure would necessarily have the cell capacity and limit discharging current to cell capacity ratio features recited in pending claim 54. For instance, skilled artisans were no doubt aware of the existence of numerous examples of lithium secondary cells used in microelectronic devices in which the cell capacity is below 2 Ah, as evidenced by Table 1 of Hommura, discussed below. This rejection should be withdrawn for this reason alone.

Moreover, Higuchi does not disclose or suggest that the non-aqueous electrolyte impregnating the separator includes at least one ring-shaped carbonate *and at least two chain-shaped carbonates*, as claimed. Higuchi instead discloses that the electrolyte includes "a mixture of the same volume of propylene carbonate and dimethoxymethane in a concentration of 1 mol/l" (col. 9, lines 16-19). As such, in addition to the failure to disclose or suggest a cell capacity and limit discharging current to cell capacity ratio, as claimed, Higuchi is further deficient in that there is no disclosure or suggestion of the specific non-aqueous electrolyte composition now recited in pending claim 54. This is another reason that this rejection should be withdrawn.

The PTO acknowledges on page 3 of the Office Action that Higuchi does not disclose any rates of electrolyte penetration through the separator, let alone the specific electrolyte penetration rate recited in pending claim 54. The PTO is, however, arguing that the claimed penetration rate is inherently disclosed by Higuchi because, the PTO alleges, the separator disclosed by Higuchi has physical

characteristics that are similar to the claimed separator. The above discussion, however, shows that Higuchi does not disclose or suggest the cell capacity, the ratio of limit discharging current to cell capacity and non-aqueous chemical composition, as claimed. As such, it is clear that the physical properties and characteristics of Higuchi's separator and electrolyte are substantially different from those of the claimed separator and non-aqueous electrolyte. The PTO's inherency theory is not legally supportable with respect to pending claim 54 and, therefore, should be withdrawn.

The PTO is arguing in the alternative that "it would have been obvious to one of ordinary skill in the art to adjust the compression (rolling) condition of the polypropylene separator in order to produce a separator of appropriate thickness, pore size, porosity and specific penetration rates" (see Office Action page 3). The Higuchi patent generically discloses that separator materials need to be porous, but does not show a recognition that any benefits are attributable to a specific rate of electrolyte penetration through a separator for a specific electrolyte composition, as claimed, let alone that the combination of a specific electrolyte penetration rate for a specific electrolyte composition can be used to insure a relatively large battery capacity (i.e., more than 2 Ah) and a ratio of a limit discharging current to the cell capacity (i.e., 30), as claimed. As such, absent Applicants' own disclosure, skilled artisans would have had absolutely no reason to modify the separator processing parameters disclosed in Higuchi in order to produce a separator having the "specific penetration rates," as alleged on page 3 of the Office Action. This is still yet another reason that this rejection is erroneous and should be withdrawn.

In view of all of the foregoing, reconsideration and withdrawal of the §102(b)/§103(a) rejection over Higuchi are respectfully requested.

4. Claims 22-25, 27 and 28 were rejected under §102(b)/§103(a) over Ondeck et al. This rejection is moot in view of the cancellation of claim 22; to the extent that this rejection might be applied against claim 54 (and all claims depending therefrom) it is respectfully traversed.

Ondeck discloses a thin microporous material that can be used, among many other applications, as a separator in a battery. Similar to Higuchi discussed above, however, Ondeck does not provide any disclosure concerning battery capacity, the amount of current discharged from the battery, or the composition of an electrolyte used in connection with the separator. As such, the above-discussed arguments with respect to the §102(b)/§103(a) rejection based on Higuchi apply equally to this rejection.

In view of all of the foregoing, reconsideration and withdrawal of the §102(b)/§103(a) rejection over Ondeck are respectfully requested.

5. Claims 22-24, 26 and 28 were rejected under §102(b)/§103(a) over Hommura et al. This rejection is moot in view of the cancellation of claim 22; to the extent that this rejection might be applied against claim 54 (and all claims depending therefrom), it is respectfully traversed.

Hommura discloses various embodiments of non-aqueous electrolyte secondary batteries, the capacities of which do not exceed 1400 mAh (see, e.g., Table 1 in Col. 7 of Hommura). As discussed above, pending independent claim 54 recites that the

capacity of the lithium secondary cell is at least 2 Ah. As such, it is clear that Hommura fails to disclose or suggest each and every feature recited in pending claim 54. This rejection should be withdrawn for this reason alone.

Hommura also fails to disclose or suggest any rates of electrolyte penetration through the separator and a ratio of limit discharging current to cell capacity, let alone the specific electrolyte penetration rate and limit discharging current to cell capacity ratio recited in pending claim 54. As such, the above-discussed arguments with respect to the §102(b)/§103(a) rejection based on Higuchi apply equally to this rejection.

In view of all of the foregoing, reconsideration and withdrawal of the §102(b)/§103(a) rejection over Hommura are respectfully requested.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

August 20, 2004

Date

SPB:SWC:jms


Stephen P. Burr

Reg. No. 32,970

BURR & BROWN
P.O. Box 7068
Syracuse, NY 13261-7068

Customer No.: 025191
Telephone: (315) 233-8300
Facsimile: (315) 233-8320